

DERWENT- 2001-346270

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DERWENT- 200559

WEEK:

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TITLE: Laminate-forming apparatus for making three-dimensional, e.g. investment casting model, comprises liquid surface leveling device working as capillary

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PRIORITY-DATA: 1999JP-0367703 (November 19, 1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE 60012667 T2	September 8, 2005	N/A	000	B29C 067/00
EP 1103368 A1	May 30, 2001	E	019	B29C 067/00
JP 2001145956 A	May 29, 2001	N/A	010	B29C 067/00
CN 1300667 A	June 27, 2001	N/A	000	B29C 035/08
KR 2001051780 A	June 25, 2001	N/A	000	B29C 035/08
US 20010042942 A1	November 22, 2001	N/A	000	B29C 035/08
US 20020084038 A1	July 4, 2002	N/A	000	B27G 011/02
EP 1103368 B1	August 4, 2004	E	000	B29C 067/00
DE 60012667 E	September 9, 2004	N/A	000	B29C 067/00
US 6821473 B2	November 23, 2004	N/A	000	B29C 035/08

**INT-CL B27G011/02, B29C035/08, B29C041/02, B29C041/12, B29C067/00, B29C071/00,
(IPC): B29K105:24, B31F005/04, B32B031/24, B44B001/02, C08F002/00**

ABSTRACTED-PUB-NO: EP 1103368A

BASIC-ABSTRACT:

NOVELTY - A three-dimensional laminate forming apparatus comprises a liquid surface leveling device (50) working as a capillary that draws up a photo-curable liquid (PCL) reserve and applies it over a laminated product that is being built up so as to form a uniform thickness of a surface layer of the photo-curable liquid with a working surface (WS) leveled and smoothed.

DETAILED DESCRIPTION - A three-dimensional laminate forming apparatus comprises a container for holding a photo-curable liquid, a product table (24), a liquid surface leveling device, and an irradiating head. The three-dimensional product is built up on the product table in progressive steps. The product table is positioned in the photo-curable liquid and adapted to incrementally advance, step-by-step, into the container. Each step is equal to a specified thickness for each solid lamina. The liquid surface leveling device defines a working gap adapted to draw photo-curable liquid by capillary action to create a photo-curable reserve. The leveling device is horizontally movable in the container to pass over a surface of photo-curable liquid when held in the container to form a smoothed and leveled photo-curable liquid surface layer over a three-dimensional laminated product that is being built up. The irradiating head forms a beam spot of reactive stimulation in the container that corresponds to the smoothed and leveled surface layer at a specified level. This cures and converts the smoothed and leveled surface layer to a solid lamina. The apparatus forms the laminated product by progressively superposing solid laminae having a specified thickness one on top of another. Each solid lamina is provided by photo-curing a photo-curable liquid surface layer.

An INDEPENDENT CLAIM is also included for a method of forming a three-dimensional laminated product from a photo-curable liquid by:

- (a) filling a container with a photo-curable liquid to define a working surface;**
- (b) advancing a product table into the photo-curable liquid incrementally step-by-step;**
- (c) drawing photo-curable liquid by capillary action into a reservoir defined in the liquid surface leveling device;**
- (d) moving the leveling device over the working surface of the photo-curable liquid in the container to coat and smooth the liquid over a three-dimensional laminated product; and**
- (e) irradiating a beam spot of reactive stimulation on the smoothed and leveled liquid surface layer to cure and convert the surface layer to a solid lamina.**

USE - For forming three-dimensional laminated products, e.g. model or core for investment casting of an ornamental jewelry craft product.

ADVANTAGE - The structure of the surface layer leveling device is simple. Its driving mechanism is also simple and inexpensive. Thus, the three-dimensional laminate forming apparatus is small in overall size, operates quickly, and has low cost.

DESCRIPTION OF DRAWING(S) - The drawing shows a side view of a liquid surface leveling device.

Product table 24

Liquid surface leveling device 50

Space 51a

Leveling blades 52

Attachment 54

Set screws 54a

Photo-curable liquid PCL

Working surface WS

ABSTRACTED-PUB-NO: US20010042942A

EQUIVALENT-ABSTRACTS:

NOVELTY - A three-dimensional laminate forming apparatus comprises a liquid surface leveling device (50) working as a capillary that draws up a photo-curable liquid (PCL) reserve and applies it over a laminated product that is being built up so as to form a uniform thickness of a surface layer of the photo-curable liquid with a working surface (WS) leveled and smoothed.

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- (c) drawing photo-curable liquid by capillary action into a reservoir defined in the liquid surface leveling device;**
- (d) moving the leveling device over the working surface of the photo-curable liquid in the container to coat and smooth the liquid over a three-dimensional laminated product; and**
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- (b) advancing a product table into the photo-curable liquid incrementally step-by-step;
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- (d) moving the leveling device over the working surface of the photo-curable liquid in the container to coat and smooth the liquid over a three-dimensional laminated product; and
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CHOSEN-DRAWING: Dwg.3/6